CONCERNING THE IDENTITY OF AMBLYOMMA MACULATUM, A. TIGRINUM, A. TRISTE, AND A. OVATUM OF KOCH, 1844

(ACARINA, IXODIDAE)

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In 1844 Koch described four South American species of *Amblyomma* which Neumann (1899) and subsequent authors regarded as synonyms of *A. maculatum* Koch, 1844 described from "Carolina," U.S.A. Recent studies of material in the Rocky Mountain Laboratory collection, plus several lots of presumed *A. maculatum* from South America kindly lent by Dr. H. de Beaurepaire Aragão of the Instituto Oswaldo Cruz in Brazil, supported my previous opinion that South American species other than *A. maculatum* had been and were continuing to be indentified as *A. maculatum*. It seemed likely that one or more of Koch's supposedly synonymic species were represented but since the descriptions of these are very inadequate the problem could be resolved only by examination of the types. These were made available to me by Prof. Dr. A. Kaestner of the Zoologisches Museum, Berlin, to whom I am deeply indebted for the favor.

The Koch species currently regarded as synonyms of *A. maculatum* are *A. tigrinum*, *A. ovatum*, *A.triste*, and *A. rubripes*. I have seen the types of all of these except the last. According to Prof. Kaestner, the types of *A. rubripes* cannot be found in the Zoologisches Museum collection.

It is evident from examination of the Koch material that, although similar in facies and details of the coxal armature, 3 distinct species are represented—*A. maculatum*, *A. triste*, and the single species represented by *A. ovatum* and *tigrinum*. These latter two are obviously one and the same species and *A. ovatum* (type, a male accompanied by labels reading "type," "ovatum Koch Montevid. Sello," "1048") is hereby reduced to a synonym of *A. tigrinum*.

Amblyomma maculatum Koch

Type.—A male with label reading "Carolina. Zimmermann." Accompanying this specimen but in another vial were 3 males and 3 labels each reading "Caracas. Gollmer." The two vials were contained within another vial in which was a label reading "type" and the number "1044." Since neither Koch nor subsequent authors have mentioned these 3 males from Caracas their status as types is questionable.

This species is readily distinguished from *A. tigrinum* and *A. triste* by the presence in both sexes of a pair of stout ventral spurs on the distal extremity of metatarsi II, III, and IV. Neumann (1899) saw the type but stated that one spur was present on metatarsi II, III, and IV and this error has been repeated in descriptions by most later

authors. The presence of paired spurs was noted by Banks (1908), Robinson (1926), Senevet (1940), and Cooley and Kohls (1944). The numerous specimens of *A. maculatum* that I have examined all come from no farther south than Colombia and Venezuela, and I therefore suspect that Robinson's male from Paraguay (his figure 12) is probably *A. tigrinum*. Boero (1944) records *A. maculatum* from several hosts and localities in Argentina but the broad bands of scutal ornamentation shown in his figure of the male (here reproduced, Fig. 1) suggest that the species actually concerned is *A. tigrinum*. Furthermore, the description modified from Neumann (1899) states that one metatarsal spur is present on legs II, III, and

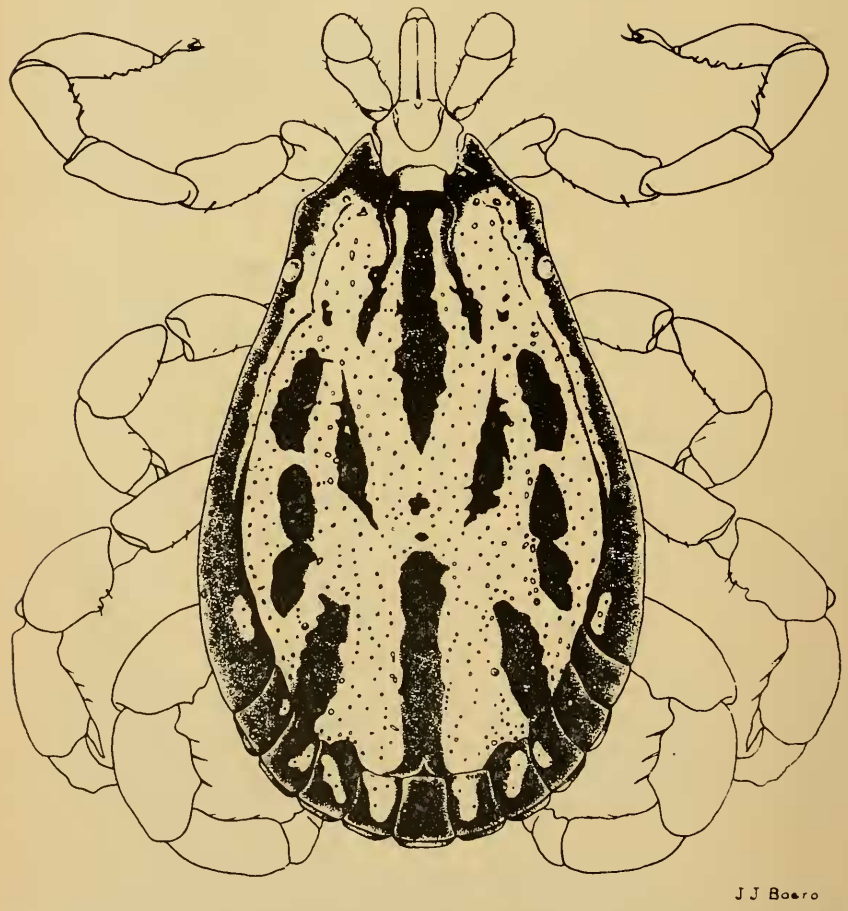

Fig. 1. Male of *Amblyomma maculatum* Koch according to Boero (1944). The broad stripes of ornamentation on the scutum suggest that the species concerned is *A. tigrinum* Koch rather than *A. maculatum*. N. J. Kramis, phot.

IV. The few specimens from Argentina that I have seen are *A. tigrinum*, and it appears likely that Ringuelet's (1948) records, as well as those of earlier authors, of *A. maculatum* in Argentina apply instead to *A. tigrinum*.

Amblyomma tigrinum Koch

Types.—Three males with labels reading "type," "tigrinum Koch. Brasil. Freyr" "1047."

This species is separable an once from *A. maculatum* by the presence of only 1 metatarsal spur on legs II, III, and IV of both sexes. The palpi are somewhat shorter and the bands of scutal ornamentation of the male are usually broader than in *A. maculatum*. *A. tigrinum* is best distinguished from *A. triste* by the absence of tubercles on the festoons. *A. boutheiri* Senevet 1940, known only from a male and 2 females off dog near Cayenne, French Guiana, appears to be closely related to *A. tigrinum* and is perhaps a synonym. From the description alone I am uncertain of its validity and I have been unable to obtain the types.

Besides the types, I have seen the following specimens, all from Brazil, sent to me by Dr. Aragão:

1 male, ex *Pseudalopex*, State of Rio Grande do Sul. Dr. Cesar Pinto, collector.
3 females, ex dog, S. Borja, State of Rio Grande do Sul, January 13, 1941, Dr. Cesar Pinto, collector.
2 males, ex dog, Belém, State of Pará, February 1955, Dr. Hugo Laemmert, collector.
1 male, ex dog, "Tamandua," State of Mato Grosso, January 23, 1955, Dr. R. Barth, collector.
5 males, 2 females, ex *Chrysocyon*, Anápolis, State of Goiás, December 17, 1936, Dr. R. M. Gilmore, collector.

Through the courtesy of Dr. Aragão, I have also seen a male and female of *A. tigrinum* from French Guiana determined by Dr. H. Floch as *A. maculatum* (Instituto Oswaldo Cruz No. 129).

Two lots totalling 1 male and 4 females in the collection of the Rocky Mountain Laboratory off dogs from unspecified localities in Argentina are clearly *A. tigrinum*.

The presence of the species in Peru is suggested by a collection at hand consisting of 7 males and 4 females from *Dusicyon culpaeus andinus* Thomas at Hacienda Capana, 3500 to 4000 meters elevation, Ocongate, Cusco, August 20, 1949, C. Kalinowski of the Chicago Natural History Museum, collector. These specimens differ from *A. tigrinum* only in being a little larger and more brightly ornamented and may be merely a local variant of that species.

Amblyomma triste Koch

Types.—Two females labeled "triste Koch Montevid. Sello," "type," and "1046."

A. triste agrees with *A. tigrinum* in having but one spur on the metatarsi of legs II, III, and IV, but differs from this species and from *A. maculatum* by the presence ventrally in both sexes of a small tubercle at the postero-internal angle of all festoons except the middle one. The pattern of ornamentation of the female scutum appears to be distinctive (Fig. 2).

The types and the following Brazilian specimens loaned to me by Dr. Aragão from the Instituto Oswaldo Cruz Collection constitute the only known records of this species:

I.O.C. No. 204, 1 male, 2 females, ex vegetation, at Jacaré, near mouth of the Culuene River, a tributary of the Xingu River in

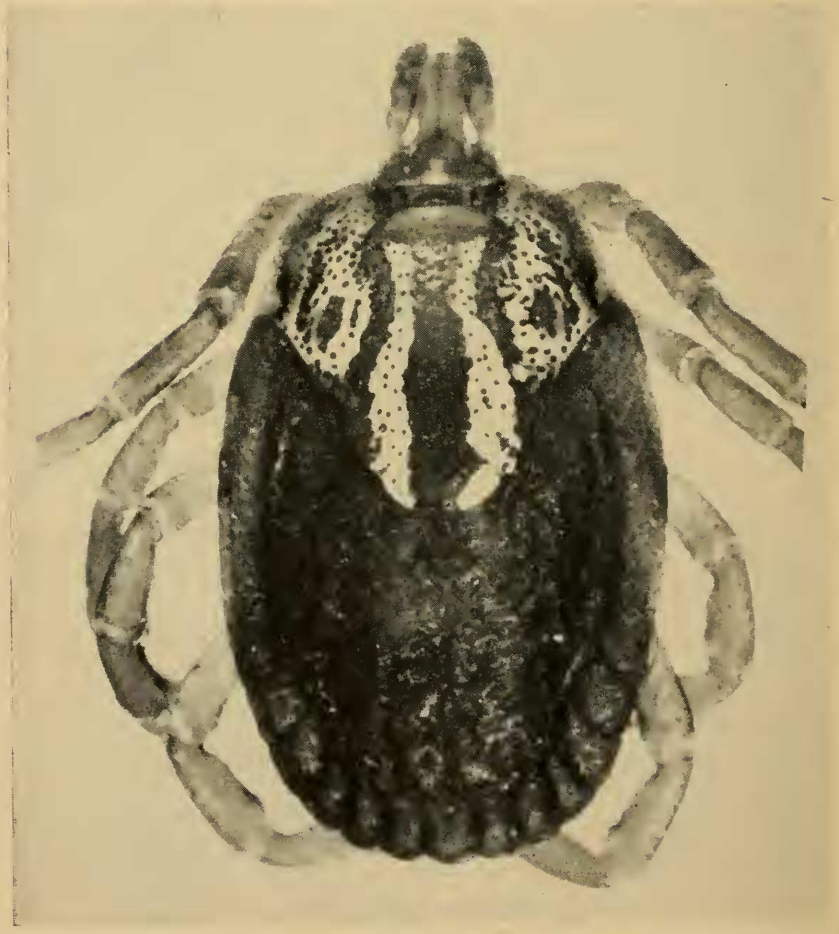

Fig. 2. Female of *Amblyomma triste* Koch. Specimen from lot No. 204 of the Instituto Oswaldo Cruz Collection. N. J. Kramis, phot.

the northeastern part of the State of Mato Grosso, 1948, Dr. J. C. de Mello Carvalho, collector.

I.O.C. No. 215, 1 female, ex *Tapirus,* locality as above, July 10, 1947, Dr. H. Sick, collector.

I.O.C. No. 696, 1 female, host unspecified, area of the Cuminá River, a tributary of the Trombetas River, which joins the Amazon near Obidos, State of Pará, 1928, Dr. Gastão Cruls, collector.

The following key is modified from Robinson (1926) and is presented to aid in the diagnosis of *maculatum, tigrinum,* and *triste:*

Marginal groove continuous, coxa I with the external spur long and acute, the internal very short and insignificant. Coxae II and III each with a short spur not so broad as long, or barely broader than long; spur on coxa IV long and slender in males, short and triangular in females. . .

1. A pair of spurs on metatarsi of legs II, III, and IV ..... *A. maculatum*
   A single spur on these metatarsi 2
2. Festoons ventrally with a tubercle at the postero-internal angle ..... *A. triste*
   Festoons without tubercles ..... *A. tigrinum*

Summary

Amblyomma tigrinum Koch, 1844, and *A. triste* Koch, 1844, long regarded as synonyms of *A. maculatum* Koch, 1844, are re-established as valid species. *A. ovatum* Koch, 1844, also long synonymized under *A. maculatum,* is found to be the same as *A. tigrinum* and is reduced to a synonym of the latter species. Koch's types of these species were examined and compared with additional material now available.

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